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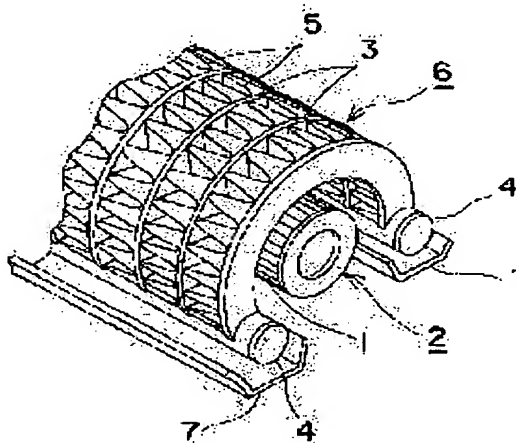
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(54) HEAT EXCHANGER FOR AIR-CONDITIONING WITH CROSS FLOW FAN AND METHOD OF PRODUCING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a heat exchanger for air-conditioning easy to produce with uniform air circulation through each part of cores.

SOLUTION: An external force is applied in the thickness direction of a core to plastically deform the core, each of flat tubes 3 is deformed into an inner face in parallel with the flat face of the flat tubes 3 with each of the flat tubes 3 kept flat. Thus, the whole cross section is bent C-shaped to form a bent core 6. The bent cores 6 are positioned in the outward direction of the radius of a cross flow fan 2 and each part of the inner rim surfaces of the bent cores 6 is positioned at a same distance with the outer peripheral surface of the cross flow fan 2.



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CLAIMS

[Claim(s)]

[Claim 1] many long and slender blades (1) Cross-flow fan (2) by whom it estranges mutually, and is arranged and the whole is formed on the same periphery around the axis tubed, respectively Many flat tubes with which each flat side countered and was arranged in parallel (3) And each flat tube (3) Corrugated fin joined between opposite flat sides (5) The core which it has, it estranges in parallel mutually and arranges -- having -- each flat tube (3) both ends -- liquid -- header (4) of the pair which is densely open for free passage Provide, and the core applies external force in the thickness direction, and plastic deformation is carried out. Each flat tube (3) Where the flat side is maintained, it deforms into a field parallel to it. Curve formation of the whole core is carried out at the shape of a cross-section C character, and it is a bending core (6). It comes to be constituted. The bending core (6) Said cross-flow fan (2) It is located in the method of the outside of radial, and is the bending core (6). Each part and the cross-flow fan (2) of inner skin Heat exchanger for air-conditioning in which a peripheral face has the cross-flow fan stationed at the abbreviation equal distance.

[Claim 2] It sets to claim 1 and he is said cross-flow fan (2). It is a bending core (6) so that opening of the shape of said cross-section C character may be located caudad, while an axis is arranged horizontally. It is inserted in a cross-flow fan (2), and is the bending core (6). The deflection direction both ends are countered and it is the drain pan (7) of a pair. Heat exchanger for air-conditioning which has the stationed cross-flow fan.

[Claim 3] Each flat tube which it countered [tube] and made each flat side arrange in parallel (3) It is a corrugated fin (5) in between. The process in which arrange, join between both contact sections to one, and the whole makes a plate-like core form, Subsequently, by applying and deforming external force plastically in the thickness direction to the core Each flat tube (3) Deform in a field parallel to the flat side, and curve formation of the whole core is carried out at the shape of a cross-section C character. Bending core (6) Each flat tube of the process made to form, and a plate-like core or a bending core (3) While inserting both ends in the tube insertion hole of the header of a pair the insertion section -- liquid -- the process joined densely -- providing -- many long and slender blades (1), respectively Cross-flow fan by whom it estranges mutually, and is arranged and the whole is formed on the same periphery around the axis tubed (2) It has. Said bending core (6) Said cross-flow fan (2) You make it located in the method of the outside of radial, and it is the bending core (6). Each part and the cross-flow fan (2) of inner skin The manufacture approach of the heat exchanger for air-conditioning of having the cross-flow fan who arranged the peripheral face at the abbreviation equal distance.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to what is used as an interior unit of the heat exchanger for air-conditioning.

[0002]

[Description of the Prior Art] The heat exchanger for air-conditioning used as an interior unit was formed as conventionally shown in drawing 7 and drawing 8 . This arranges a stacked fin mold heat exchanger on the cross-flow fan's 2 periphery. That is, have areole, many long and slender plate fins are made to arrange in parallel, a tube is inserted in each tube insertion hole, between the opening edge is connected by U bend tube, the refrigerant passage of the letter of meandering is constituted, and the whole makes two or more plate-like stacked fin mold heat exchangers.

[0003] And each stacked fin mold heat exchanger is arranged so that a cross-flow fan's surroundings may be surrounded, and mutual refrigerant passage is connected in order. and while circulating the refrigerant of a vapor-liquid two phase condition in the tube of each stacked fin mold heat exchanger, a cross-flow fan is rotated -- making -- the airstream 13 for [cooled from the external surface side of each stacked fin mold heat exchanger] -- flowing -- the monotonous core 10 of each stacked fin mold heat exchanger -- the -- it cooled airstream 13 and it was made to flow out of lower part side opening of casing 8

[0004]

[Problem(s) to be Solved by the Invention] While the circulation direction and flow rate of airstream 13 by which the heat exchanger for air-conditioning of the conventional type which has arranged two or more monotonous cores 10 which consist of a stacked fin mold heat exchanger on the cross-flow fan's 2 periphery flows into each monotonous core 10 differ from each other, the inflow of air differs in each part also to one monotonous core 10. Therefore, there is a fault which cannot fully pull out the heat exchange engine performance of each monotonous core 10. With it, work and an assembly were troublesome, and there was a fault more than which components mark increase. Then, this invention aims at solving the starting technical problem.

[0005]

[Means for Solving the Problem] many blades (1) with long and slender this invention according to claim 1 Cross-flow fan (2) by whom it estranges mutually, and is arranged and the whole is formed on the same periphery around the axis tubed, respectively Many flat tubes with which each flat side countered and was arranged in parallel (3) And each flat tube (3) Corrugated fin joined between opposite flat sides (5) The core which it has, it estranges in parallel mutually and arranges -- having -- each flat tube (3) both ends -- liquid -- header (4) of the pair which is densely open for free passage Provide, and the core applies external force in the thickness direction, and plastic deformation is carried out. Each flat tube (3) Where the flat side is maintained, it deforms into a field parallel to it. Curve formation of the whole core is carried out at the shape of a cross-section C character, and it is a bending core (6). It comes to be constituted. The bending core (6) Said cross-flow fan (2) It is located in the method of the outside of radial, and is the bending core (6). Each part and the cross-flow fan (2) of inner skin A peripheral face is the heat exchanger for air-conditioning which has the cross-flow fan stationed at the abbreviation equal distance.

[0006] It sets to claim 1 and this invention according to claim 2 is said cross-flow fan (2). It is a bending core (6) so that opening of the shape of said cross-section C character may be located caudad, while an axis is arranged horizontally. It is inserted in a cross-flow fan (2), and is the bending core (6). The deflection direction both ends are countered and it is the drain pan (7) of a pair. It is the heat exchanger for air-conditioning which has the stationed cross-flow fan.

[0007] This invention according to claim 3 is each flat tube (3) which it countered [tube] and made each flat side arrange in parallel. It is a corrugated fin (5) in between. The process in which arrange, join between both contact sections to one, and the whole makes a plate-like core form, Subsequently, by applying and deforming external force plastically in the thickness direction to the core Each flat tube (3) Deform in a field parallel to the flat side, and curve formation of the whole core is carried out at the shape of a cross-section C character. Bending core (6) Each flat tube of the process made to form, and a plate-like core or a bending core (3) While inserting both ends in the tube insertion hole of the header of a pair the insertion section -- liquid -- the process joined densely -- providing -- many long and slender blades (1), respectively Cross-flow

fan by whom it estranges mutually, and is arranged and the whole is formed on the same periphery around the axis tubed (2) It has. Said bending core (6) Said cross-flow fan (2) You make it located in the method of the outside of radial, and it is the bending core (6). Each part and the cross-flow fan (2) of inner skin It is the manufacture approach of the heat exchanger for air-conditioning of having the cross-flow fan who arranged the peripheral face at the abbreviation equal distance.

[0008]

[Embodiment of the Invention] Next, based on a drawing, it explains per gestalt of operation of this invention. Drawing 1 is the important section strabism schematic drawing of the heat exchanger for air-conditioning which has the cross-flow fan of this invention, and drawing 2 is the side-face schematic drawing. This example is a heat exchanger for air-conditioning used as an interior unit, and the bending core 6 is inserted in the way outside the cross-flow fan 2. That side face is formed in the shape of radii, and this bending core 6 is arranged so that the axis of that bending core 6 and the cross-flow fan's 2 axis may carry out abbreviation coincidence. The bending core 6 has the corrugated fin 5 with which each flat side is pinched between the flat tube 3 of a large number countered and arranged in parallel, and them, and the edge of each flat tube 3 is inserted in the tube insertion hole of the pipe-like header 4.

[0009] And a plate-like core is constituted, in the thickness direction, external force is applied and the core is deformed plastically, soldering immobilization of between each part articles is carried out in one, it is in the condition at which each flat tube 3 maintained the flat side, and deforms into a flat surface parallel to it, and curve formation is carried out so that the cross section of the whole core may become C character-like. And as for this bending core 6, that inside-and-outside peripheral surface is formed in the approximate circle arc. And the cross-flow fan 2 levels the axis, and is stationed in the core of casing 8, and the bending core 6 is arranged approximately concentric at the axis. This bending core 6 is circular, and that axial cross section is formed in the shape of a C character, and the header 4 is arranged to those both ends. And it is attached in casing 8 so that the opening side of the shape of the C character may be located downward. A drain pan 7 is arranged under each header 4.

[0010] Each of many long and slender blades 1 estranges the cross-flow fan 2 of each other on the same periphery around an axis, he is stationed, and is the well-known thing by which the whole was formed in tubed. While the cross-flow fan's 2 end section is connected with a motor and a rotation drive is carried out, the refrigerant of a vapor-liquid two phase condition flows from one header 4, and it is led to an exterior unit through the compressor which circulates, reaches the header 4 of another side and does not illustrate each flat tube 3 from the header 4.

[0011] And airstream 13 flows into the external surface and the corrugated fin 5 of each flat tube 3 equally [abbreviation] toward the radiation direction core side, heat exchange is carried out to the refrigerant in each tube, and cooling air is indoors emitted from the diffuser 9 of casing 8. At this time, subsequently, the water of condensation 12 arises on the external surface of the corrugated fin 5 and the flat tube 3, it is carried to airstream 13 and it is brought together in the lee-side edge of the flat tube 3, and it flows down caudad along the edge of the flat tube 3, and like drawing 4 , it is caught by the drain pan 7 and discharged outside.

[0012] In addition, in the production process of the bending core 6, the flat tube 3 is arranged so that the flat side of both sides may counter mutually, respectively, the corrugated fin 5 is pinched among them, and top 5a and trough 5b (drawing 5) of a wave of the corrugated fin 5 contact the flat tube 3. And the whole is inserted into a hot furnace in the condition which shows in drawing 5 , the wax material covered by the outside surface of the flat tube 3 is fused, and soldering immobilization of between each contact section of the corrugated fin 5 and the flat tube 3 is carried out.

[0013] At this time, top 5a and trough 5b of a wave of a corrugated fin are arranged in parallel respectively mutually. Subsequently, if external force is applied to it and curve formation is carried out, it curves in parallel with the flat surface of the flat tube 3, and top 5a and trough 5b of a wave which are soldered at it will deform with the flat tube 3, and will be formed in a flabellate form. Therefore, airstream 13 is smoothly led to the cross-flow fan's 2 core side, respectively, when flowing along with top 5a and trough 5b of the wave.

[0014] Moreover, although it can carry out after the bending process of a core inserting each edge of the flat tube 3 in the tube insertion hole of a header 4 and carrying out soldering immobilization of the insertion section Before replacing with it and attaching a header 4, only the flat tube 3 and the corrugated fin 5 may be cursed, they may be incurvated in the condition, the edge of the flat tube 3 may be behind inserted in the tube hole of a header 4, and the process which solders the insertion section may be used.

[0015]

[Function and Effect of the Invention] According to this invention according to claim 1, since each part of inner skin of the bending core 6 and the cross-flow fan's 2 peripheral face are arranged at the abbreviation equal distance, the heat exchange in each part of a heat exchanger can be held to abbreviation homogeneity, and the heat exchange engine performance can be raised. Moreover, it is compact as a whole and the heat exchanger of a small tooth space can be offered. With it, since bending core 6 the very thing comes to deform a plate-like core plastically, it is [that it is easy to manufacture] easy to attach.

[0016] The cross-flow fan's 2 axis is arranged horizontally. according to this invention according to claim 2 It is inserted in the cross-flow fan 2 so that opening of the shape of a cross-section C character of the bending core 6 may be located caudad. Since the deflection direction both ends of the bending core 6 are countered and a drain pan 7 is arranged, finally the water of condensation produced in the corrugated fin 5 and the flat tube 3 is collected along the inner circumference edge of the flat tube 3, flows down caudad along the edge, and is caught by the drain pan 7. Therefore, the water of condensation is brought together in a drain pan 7 in endmost part distance, is eliminated quickly, and has the effectiveness which secures circulation of air to the maximum by that cause, and can improve the heat exchange engine performance.

[0017] According to this invention according to claim 3, the flat tube 3 and the corrugated fin 5 are joined in one, the whole is used as a plate-like core, and since it is incurvated and the bending core 6 is manufactured, components mark can offer cheaply the core which is easy to manufacture few.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Important section strabism schematic drawing of the heat exchanger for air-conditioning which has the cross-flow fan of this invention.

[Drawing 2] Side-face schematic drawing of the heat exchanger for the said air-conditioning.

[Drawing 3] The cross-sectional view of the flat tube 3 used for the heat exchanger for the said air-conditioning.

[Drawing 4] The explanatory view showing the airstream 13 in the heat exchanger for the said air-conditioning, and the flow condition of the water of condensation 12.

[Drawing 5] The important section explanatory view of the 1st process showing the manufacture approach of the bending core 6 in the heat exchanger for the said air-conditioning.

[Drawing 6] The important section explanatory view of the 2nd process showing the manufacture approach of the bending core 6 in the heat exchanger for the said air-conditioning.

[Drawing 7] Important section strabism schematic drawing of the heat exchanger for conventional-type air-conditioning.

[Drawing 8] Side-face schematic drawing of the heat exchanger for the said air-conditioning.

[Description of Notations]

- 1 Blade
- 2 Cross-Flow Fan
- 3 Flat Tube
- 4 Header
- 5 Corrugated Fin
- 5a Crowning
- 5b Trough
- 6 Bending Core

7 Drain Pan
8 Casing
8a Wall surface
9 Diffuser
10 Monotonous Core
11 Suction Opening
12 Water of Condensation
13 Airstream

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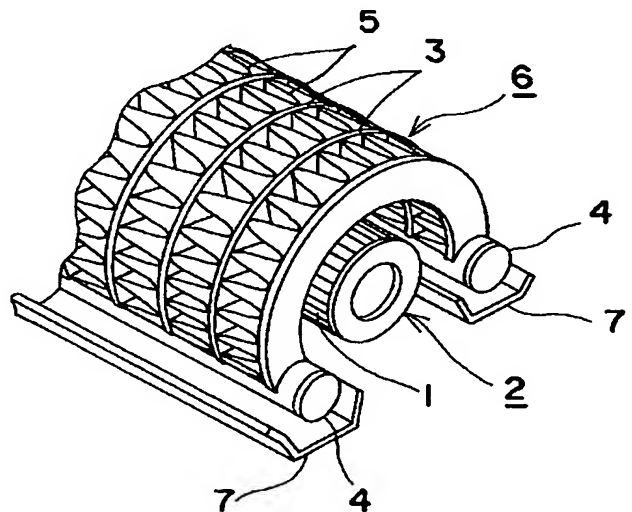
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(54)【発明の名称】 クロスフローファンを有する空調用熱交換器およびその製造方法

(57)【要約】

【課題】 製造し易くコンパクトでコア各部に均一に空気が流通する空調用熱交換器の提供。

【解決手段】 コアの厚み方向に外力を加えて塑性変形し、夫々の偏平チューブ3は平坦面を保った状態でそれに平行な内面に変形され、コア全体が横断面C字状に湾曲形成されて曲げコア6が構成される。そして曲げコア6をクロスフローファン2の半径方向外方に位置させ、曲げコア6の内周面の各部とクロスフローファン2の外周面とを略等距離に配置する。



【特許請求の範囲】

【請求項1】 多数の細長いブレード(1)の夫々が、その軸線の回りの同一円周上に互いに離間して配置され、全体が筒状に形成されるクロスフローファン(2)と、夫々の平坦面が対向して並列された多数の偏平チューブ(3)および、各偏平チューブ(3)の対向平坦面間に接合されたコルゲートフィン(5)を有するコアと、互いに平行に離間して配置され、夫々の偏平チューブ(3)の両端が液密に連通する一対のヘッダ(4)と、を具備し、

そのコアが、その厚み方向に外力を加えて塑性変形され、夫々の偏平チューブ(3)はその平坦面を保った状態でそれに平行な面内に変形され、コア全体が横断面C字状に湾曲形成されて、曲げコア(6)が構成されてなり、その曲げコア(6)が前記クロスフローファン(2)の半径方向外方に位置されて、その曲げコア(6)の内周面の各部とクロスフローファン(2)の外周面とが、略等距離に配置されたクロスフローファンを有する空調用熱交換器。

【請求項2】 請求項1において、前記クロスフローファン(2)の軸線が水平に配置されると共に、前記横断面C字状の開口部が下方に位置するように、曲げコア(6)がクロスフローファン(2)に被嵌され、

その曲げコア(6)の曲がり方向両端に対向して一対のドレンパン(7)が配置されたクロスフローファンを有する空調用熱交換器。

【請求項3】 夫々の平坦面を対向して並列させた各偏平チューブ(3)間にコルゲートフィン(5)を配置し両者の接触部間を一体に接合して全体が平板状のコアを形成させる工程と、

次いでそのコアに、その厚み方向に外力を加えて塑性変形することにより、夫々の偏平チューブ(3)をその平坦面に平行な面内で変形し、コア全体を横断面C字状に湾曲形成して、曲げコア(6)を形成させる工程と、

平板状のコアまたは曲げコアの夫々の偏平チューブ(3)の両端を、一対のヘッダのチューブ挿通孔に挿通すると共に、その挿通部を液密に接合する工程と、

を具備し、

多数の細長いブレード(1)の夫々が、その軸線の回りの同一円周上に互いに離間して配置され、全体が筒状に形成されるクロスフローファン(2)を有し、

前記曲げコア(6)を前記クロスフローファン(2)の半径方向外方に位置させて、その曲げコア(6)の内周面の各部とクロスフローファン(2)の外周面とを、略等距離に配置させたクロスフローファンを有する空調用熱交換器の製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、空調用熱交換器の

室内機として使用されるものに関する。

【0002】

【従来の技術】室内機として用いられる空調用熱交換器は、従来図7及び図8に示すように形成されていた。これはクロスフローファン2の外周にスタックドフィン型熱交換器を配置するものである。即ち、多数の細長いプレートフィン(5)を小隙を有して並列させ、夫々のチューブ挿通孔にチューブを挿通し、その開口端間をUバンドチューブで連結して蛇行状の冷媒流路を構成し、全体が平板状のスタックドフィン型熱交換器を複数制作する。

【0003】そして、各スタックドフィン型熱交換器をクロスフローファンの回りを取り囲むように配置し、互いの冷媒流路を順に連結したものである。そして各スタックドフィン型熱交換器のチューブ内に気液二相状態の冷媒を流通させると共に、クロスフローファンを回転させ、各スタックドフィン型熱交換器の外周側から被冷却用の空気流13を流入し、各スタックドフィン型熱交換器の平板コア10によってその空気流13冷却して、ケーシング8の下部側開口からそれを流出させていた。

【0004】

【発明が解決しようとする課題】スタックドフィン型熱交換器からなる複数の平板コア10をクロスフローファン2の外周に配置した従来型の空調用熱交換器は、各平板コア10に流入する空気流13の流通方向および流量は異なると共に、1つの平板コア10に対しても各部で空気の流入量が異なる。そのため、各平板コア10の熱交換性能を十分に引き出せない欠点がある。それと共に、制作及び組立てが面倒で部品点数が多くなる欠点があった。そこで本発明は、係る課題を解決することを目的とする。

【0005】

【課題を解決するための手段】請求項1に記載の本発明は、多数の細長いブレード(1)の夫々が、その軸線の回りの同一円周上に互いに離間して配置され、全体が筒状に形成されるクロスフローファン(2)と、夫々の平坦面が対向して並列された多数の偏平チューブ(3)および、各偏平チューブ(3)の対向平坦面間に接合されたコルゲートフィン(5)を有するコアと、互いに平行に離間して配置され、夫々の偏平チューブ(3)の両端が液密に連通する一対のヘッダ(4)と、を具備し、そのコアが、その厚み方向に外力を加えて塑性変形され、夫々の偏平チューブ(3)はその平坦面を保った状態でそれに平行な面内に変形され、コア全体が横断面C字状に湾曲形成されて、曲げコア(6)が構成されてなり、その曲げコア(6)が前記クロスフローファン(2)の半径方向外方に位置されて、その曲げコア(6)の内周面の各部とクロスフローファン(2)の外周面とが、略等距離に配置されたクロスフローファンを有する空調用熱交換器である。

【0006】請求項2に記載の本発明は、請求項1において、前記クロスフローファン(2)の軸線が水平に配置されると共に、前記横断面C字状の開口部が下方に位置

するように、曲げコア(6)がクロスフローファン(2)に被嵌され、その曲げコア(6)の曲がり方向両端に対向して一对のドレンパン(7)が配置されたクロスフローファンを有する空調用熱交換器である。

【0007】請求項3に記載の本発明は、夫々の平坦面を対向して並列させた各偏平チューブ(3)間にコルゲートフィン(5)を配置し両者の接触部間を一体に接合して全体が平板状のコアを形成させる工程と、次いでそのコアに、その厚み方向に外力を加えて塑性変形することにより、夫々の偏平チューブ(3)をその平坦面に平行な面内で変形し、コア全体を横断面C字状に湾曲形成して、曲げコア(6)を形成させる工程と、平板状のコアまたは曲げコアの夫々の偏平チューブ(3)の両端を、一对のヘッダのチューブ挿通孔に挿通すると共に、その挿通部を液密に接合する工程と、を具備し、多数の細長いブレード(1)の夫々が、その軸線の回りの同一円周上に互いに離間して配置され、全体が筒状に形成されるクロスフローファン(2)を有し、前記曲げコア(6)を前記クロスフローファン(2)の半径方向外方に位置させて、その曲げコア(6)の内周面の各部とクロスフローファン(2)の外周面とを、略等距離に配置させたクロスフローファンを有する空調用熱交換器の製造方法である。

【0008】

【発明の実施の形態】次に、図面に基づいて本発明の実施の形態につき説明する。図1は本発明のクロスフローファンを有する空調用熱交換器の要部斜視略図であり、図2はその側面略図である。この例は、室内機として用いられる空調用熱交換器であって、クロスフローファン2の外方に曲げコア6が被嵌されている。この曲げコア6はその側面が円弧状に形成され、その曲げコア6の軸線とクロスフローファン2の軸線が略一致するように配置される。曲げコア6は、夫々の平坦面が対向して並列された多数の偏平チューブ3及びそれらの間に挟持されるコルゲートフィン5を有し、各偏平チューブ3の端部がパイプ状のヘッダ4のチューブ挿通孔に挿通される。

【0009】そして各部品間を一体的にろう付け固定して平板状のコアを構成し、そのコアを厚み方向に外力を加えて塑性変形し、夫々の偏平チューブ3が平坦面を保った状態で、それに平行な平面内に変形されて、コア全体の横断面がC字状になるように湾曲形成されたものである。そしてこの曲げコア6は、その内外周面が略円弧状に形成されている。そしてクロスフローファン2がケーシング8の中心部にその軸線を水平にして配置され、その軸線に略同心に曲げコア6が配置される。この曲げコア6は円弧状であり且つ、その軸断面がC字状に形成され、その両端にヘッダ4が配置されている。そして、そのC字状の開口側が下向きに位置するようにケーシング8に取付けられる。夫々のヘッダ4の下方には、ドレンパン7が配置される。

【0010】クロスフローファン2は、多数の細長いブ

レード1の夫々が軸線の回りの同一円周上に互いに離間して配置され、全体が筒状に形成された公知のものである。そのクロスフローファン2の一端部がモータに連結されて回転駆動されると共に、一方のヘッダ4から気液二相状態の冷媒が流入し、各偏平チューブ3を流通して他方のヘッダ4に達し、そのヘッダ4から図示しないコンプレッサを介し室外機に導かれる。

【0011】そして各偏平チューブ3の外面及びコルゲートフィン5に空気流13が放射方向中心側に向かって略均等に流入し、各チューブ内の冷媒と熱交換されてケーシング8の吹き出し口9から室内に冷却空気が放出される。このとき、コルゲートフィン5及び偏平チューブ3の外面に凝縮水12が生じ、それが空気流13に運ばれて偏平チューブ3の風下端に集められ、次いでそれが偏平チューブ3の縁部に沿って下方に流下し、図4の如くドレンパン7に捕捉され、外部に排出される。

【0012】なお、曲げコア6の製造工程において偏平チューブ3は夫々両側の平坦面が互いに対向するように配置され、それらの間にコルゲートフィン5が挟持され、コルゲートフィン5の波の頂部5aおよび谷部5b(図5)が偏平チューブ3に接触する。そして図5に示す状態で全体が高温の炉内に挿入され、偏平チューブ3の外表面に被覆されたろう材を溶融して、コルゲートフィン5と偏平チューブ3との各接触部間がろう付け固定される。

【0013】このとき、コルゲートフィンの波の頂部5aおよび谷部5bは夫々互いに平行に配置されている。次いで、それに外力を加えて湾曲形成すると、偏平チューブ3の平面に平行に湾曲され、それにろう付けされている波の頂部5aおよび谷部5bは偏平チューブ3と共に変形し扇状に形成される。そのため、空気流13はその波の頂部5aおよび谷部5bに沿って流入するとき、夫々クロスフローファン2の中心側に円滑に導かれる。

【0014】また、コアの曲げ工程は偏平チューブ3の各端部をヘッダ4のチューブ挿通孔に挿通し、その挿通部をろう付け固定した後に行うことができるが、それに代えてヘッダ4を取付ける前に偏平チューブ3とコルゲートフィン5のみのろう付け状態でそれらを湾曲させ、後に偏平チューブ3の端部をヘッダ4のチューブ孔に挿通し、その挿通部をろう付けする工程を用いてもよい。

【0015】

【発明の作用・効果】請求項1に記載の本発明によれば、曲げコア6の内周面各部とクロスフローファン2の外周面とが略等距離に配置されたものであるから、熱交換器各部における熱交換を略均一に保持して熱交換性能を高めることができる。また、全体としてコンパクトで小スペースの熱交換器を提供できる。それと共に、曲げコア6自体は平板状のコアを塑性変形してなるものであるから、製造し易く且つ取付けが容易である。

【0016】請求項2に記載の本発明によれば、クロス

フローファン2の軸線が水平に配置され且つ、曲げコア6の横断面C字状の開口部が下方に位置するようにクロスフローファン2に被嵌され、その曲げコア6の曲がり方向両端に対向してドレンパン7が配置されたものであるから、コルゲートフィン5及び偏平チューブ3に生じた凝縮水は最終的に偏平チューブ3の内周縁に沿って集められ、その縁部に沿って下方に流下してドレンパン7に捕捉される。そのため、凝縮水は最端距離でドレンパン7に集められて迅速に排除され、それにより空気の流通を最大限に確保して熱交換性能を向上できる効果がある。

【0017】請求項3に記載の本発明によれば、偏平チューブ3とコルゲートフィン5とを一体的に接合して全体を平板状のコアとし、それを湾曲させて曲げコア6を製造するものであるから、部品点数が少なく製造し易いコアを安価に提供できる。

【図面の簡単な説明】

【図1】本発明のクロスフローファンを有する空調用熱交換器の要部斜視略図。

【図2】同空調用熱交換器の側面略図。

【図3】同空調用熱交換器に用いられる偏平チューブ3の横断面図。

【図4】同空調用熱交換器における空気流13及び凝縮水12の流れ状態を示す説明図。

【図5】同空調用熱交換器における曲げコア6の製造方法を示す第1工程の要部説明図。

【図6】同空調用熱交換器における曲げコア6の製造方法を示す第2工程の要部説明図。

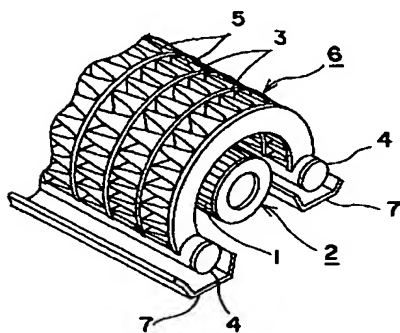
【図7】従来型空調用熱交換器の要部斜視略図。

【図8】同空調用熱交換器の側面略図。

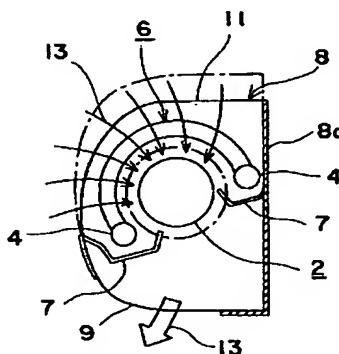
【符号の説明】

- 1 ブレード
- 2 クロスフローファン
- 3 偏平チューブ
- 4 ヘッド
- 5 コルゲートフィン
- 5a 頂部
- 5b 谷部
- 6 曲げコア
- 7 ドレンパン
- 8 ケーシング
- 8a 壁面
- 9 吹き出し口
- 10 平板コア
- 11 吸い込み口
- 12 凝縮水
- 13 空気流

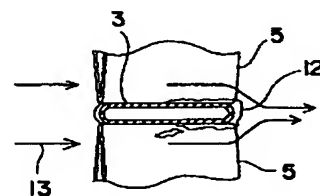
【図1】



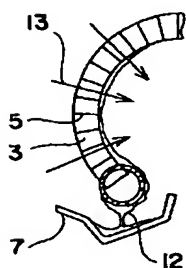
【図2】



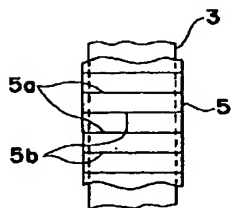
【図3】



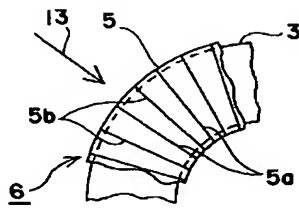
【図4】



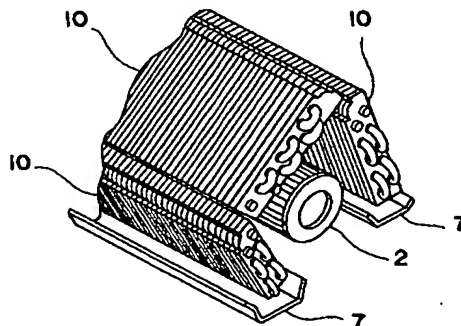
【図5】



【図6】



【図7】



【図8】

